Equipment Requirements

Objectives:

- Identify the four classes of recreational vessels
- Be familiar with and name the required safety equipment required by Federal, state and USACE laws and regulations
- Describe the proper use and application of the safety equipment

Vessel Classes

- CLASS A = vessels less than 16ft (4.9m)
- CLASS I = vessels 16ft to less than 26ft (4.9m – 7.9m)
- CLASS II = vessels 26ft to less than 40ft (7.9m – 12.2m)
- CLASS III = vessels 40ft to less than 65ft (12.2m – 19.8m)

Each class of vessels has minimum equipment requirements established by Federal law. Individual states and the Corps of Engineers also have specific equipment requirements for vessels under their jurisdiction.

- Federal (U.S. Coast Guard)
- State
- U.S. Army Corps of Engineers (EM 385-1-1)

Fire Class & Fire Extinguisher Type

Fuel Source	Class of Fire		Type of Extinguisher (Extinguishing Agent)
Ordinary combustibles (e.g. trash, wood, paper, cloth)	A		Water; chemical foam; dry chemical*
Flammable liquids (e.g. oils, grease, tar, gasoline, paints, thinners)	B		Carbon dioxide (CO2); halon**; dry chemical; aqueous film forming foam (AFFF)
Electricity (e.g. live electrical equipment)	C		CO2; halon; dry chemical
Combustible metals (e.g. magnesium, titanium)	D		Dry powder (suitable for the specific combustible metal involved)

Fire extinguisher requirements on recreational vessels.

1. The number of approved fire extinguishers depends upon the length and/or construction of the vessel.

2. Fire extinguishers are required on all recreational boats which have compartments and where explosive or flammable gases or vapors can be trapped. The following conditions require a fire extinguisher.

a. Closed compartments under thwarts and seats wherein portable fuel tanks may be stored.

b. Unsealed double-bottoms not completely filled with flotation material.

c. Closed living spaces.

d. Closed stowage compartment in which combustible or flammable materials are stowed.

e. Permanently installed fuel tanks. A tank is permanent if it is secured in any way. If weight or location is such as to likely prevent someone from removing it in an emergency, the tank is considered permanent.

Boat Length	Without fixed system	With fixed system
Less than 26 ft.	1 B-I	None
26 ft. to under 40 ft.	2 B-I or 1 B-II	1 B-I
40 ft. to 65 ft.	3 B-I or 1 B-II and 1 B-I	2 B-I or 1 B-II

- USCG Approved, label will state similar to:

"Marine Type USCG
Type B:C Size I
Approval Number 162.028/EX2764
Valid Only With Bracket 817"

- Must be mounted in their specific marine type bracket in a readily accessible position
- Inspect monthly, replace as necessary

PFD Requirements

- Proper Number and Type
- Proper Size for the Wearer
- U.S. Coast Guard Approved
- Readily Accessible
- Serviceable Condition

PFD Requirements

Class A Boats:

On boats less than 16 feet in length there must be one Type I, II, III, or V PFD for each person on board.

Class I, II, and III boats

On boats 16 feet in length and over there must be one Type I, II, III, or V PFD for each person on board plus at least one Type IV PFD.

The Type IV throwable device must be *immediately* available.

Type I PFD (minimum 22 lbs. of buoyancy)

Advantages:

- Turns unconscious victims to vertical and slightly backward position.
- Floats you the best.

Disadvantages:

- Bulky
- Uncomfortable

Only come in two sizes

Type II PFD (minimum 15.5 lbs. of buoyancy)

Advantages:

- Turns some unconscious wearers face-up in the water.
- Less bulky than Type I PFD's.
- More comfortable than Type I PFD's.

Disadvantages:

- Will not turn all wearers face-up.
- Less buoyant than Type I PFD's
- Not suitable for long hours in rough water.

Comes in 4 sizes

Type III PFD (minimum 15.5 lbs. of buoyancy)

Advantages:

- Usually the most comfortable type for continuous wear.
- Provides freedom of movement for boating activities.
- Available in many sizes, colors and styles.

Disadvantages:

- Not for rough water.
- Wearer may have to tilt head back to avoid facedown position in water. Not designed to turn unconscious wearer face-up in the water.

NOTE: Type III must have Impact Rating that indicates PFD should survive the stress of contacting water at a certain speed. Does not guarantee the person will survive.

Type IV PFD (minimum buoyancy is 16.5 lbs. for ring buoys or 18 lbs. for boat cushions)

Advantages:

- Can be thrown to someone in the water.
- Some can be used as a seat cushion

Disadvantages:

- Must be grasped and held to be effective.
- Not for unconscious persons, non-swimmers, or children.
- Not for many hours in rough water.

Types: Cushions, ring buoys, horseshoe buoys.

Type V PFD

Special use PFD's: (minimum buoyancy of 15.5 lbs.)

- Include work vests, deck suits, whitewater vests, and float coats.
- Must be used for specified activity.
- Provide extra degree of comfort to we
- Must be worn.

Hybrid Inflatables:

- Must be worn.
- Must follow manufacturer's maintenance recommendations.

PFD Buoyancy

How can a TYPE I PFD with 22 pounds of buoyancy hold up a two hundred pound person in the water?

You have to do the math! Let's take the example of a 200 pound person. Approximately 80% of the body is water. Water in the body has no weight in water.

200 lbs. X 80% = 160 lbs.

200 lbs. - 160 lbs. = 40 lbs.

So now we are down to having to support only 40 pounds. But the PFD only has a buoyancy rating of 22 lbs. How can it hold up 40 lbs? On average our bodies also have 15% fat and fat is lighter than water.

200 lbs. X 15% = 30 lbs.

40 lbs. - 30 lbs. = 10 lbs.

Now you can see that the average 200 pound person only weighs about 10 pounds in water. The 22 lbs of buoyancy in your PFD is more than enough to keep the person afloat.

PFD Accessories

- Knife
- Signal mirror
- Whistle
- Flashlight
- Waterproof meteor flares
- Strobe light
- Anything that will help people find you, keep you alive, keep you afloat.

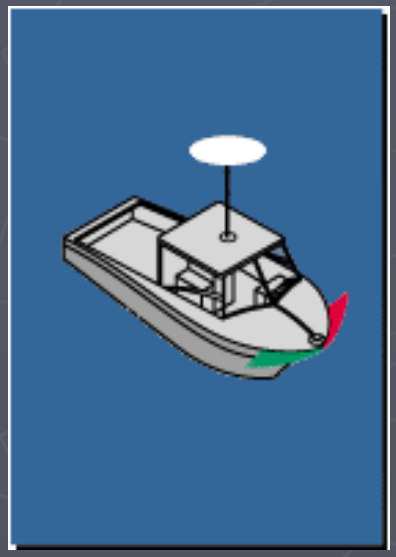
Navigation Lights

- To prevent collisions
- To comply with Federal law
- To tell other boaters
  - Type of vessel you are
  - Size of vessel you are
  - Direction (movement) of your vessel
  - Work you are performing

Power-driven less than 65.5 ft/20 meters

- Must display
  - Masthead light – forward
  - Red and Green sidelights
  - Stern light

Power-driven less than 39.4 ft/12 meters



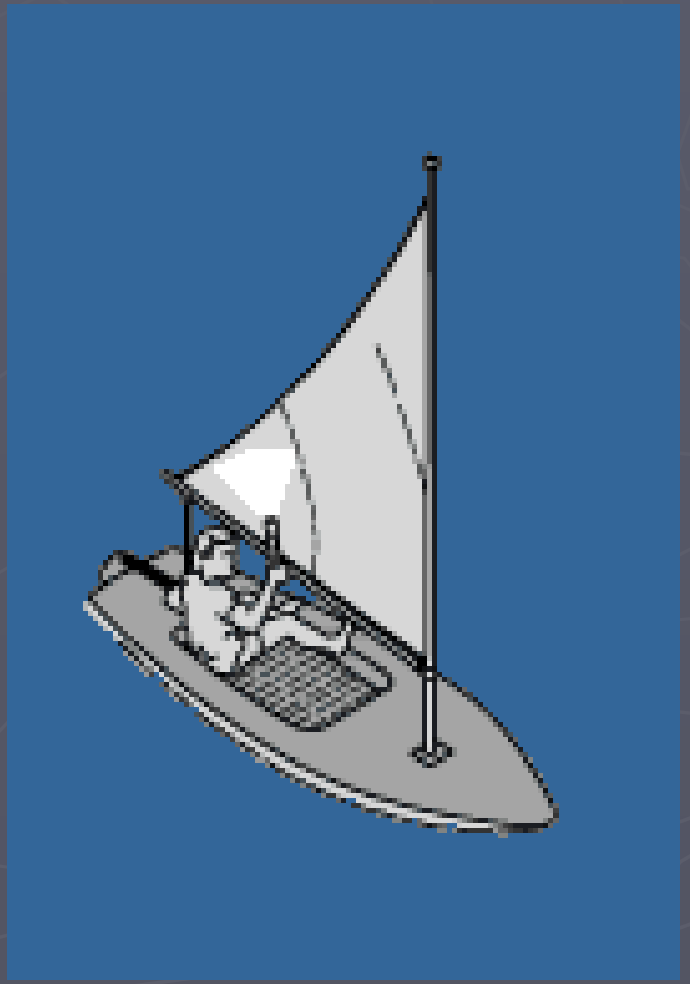
- May Display
  - 360 degree all around white light
  - Red and green sidelights

Sailing Vessels less than 65.6 ft/20 meters

- Stern light
- Red and green sidelights
- If sailboat is under power, power-driven vessel requirements apply.

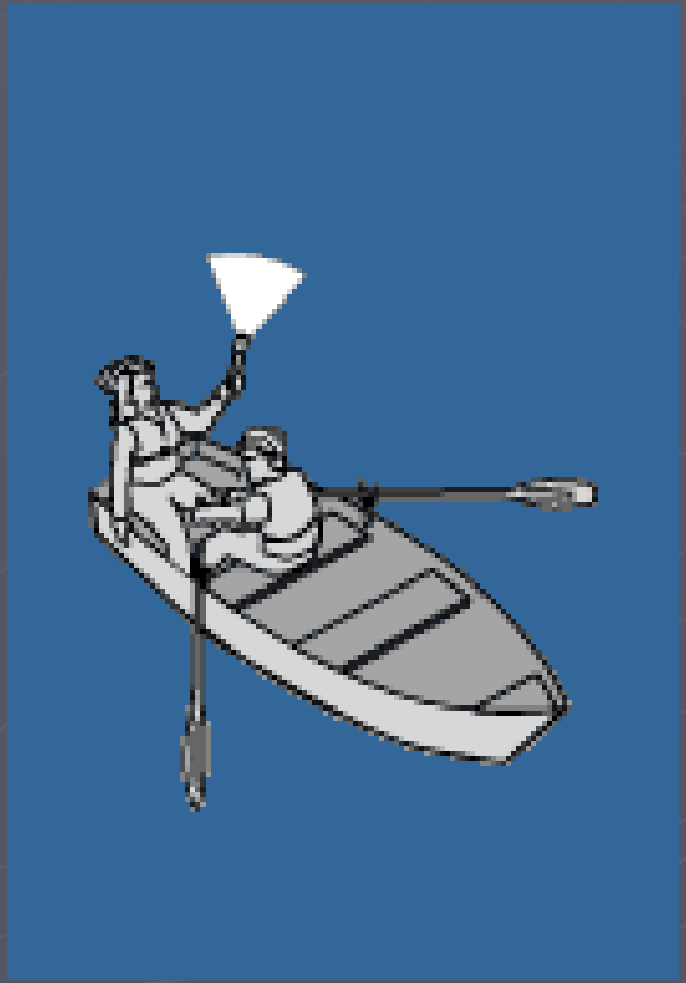
Sailing Vessel less than 23 ft/7 meters

- Should display lights for a sailboat, if practicable.
- As an option, your vessel may carry a flashlight or lighted lantern that can show a white light in sufficient time to prevent collision



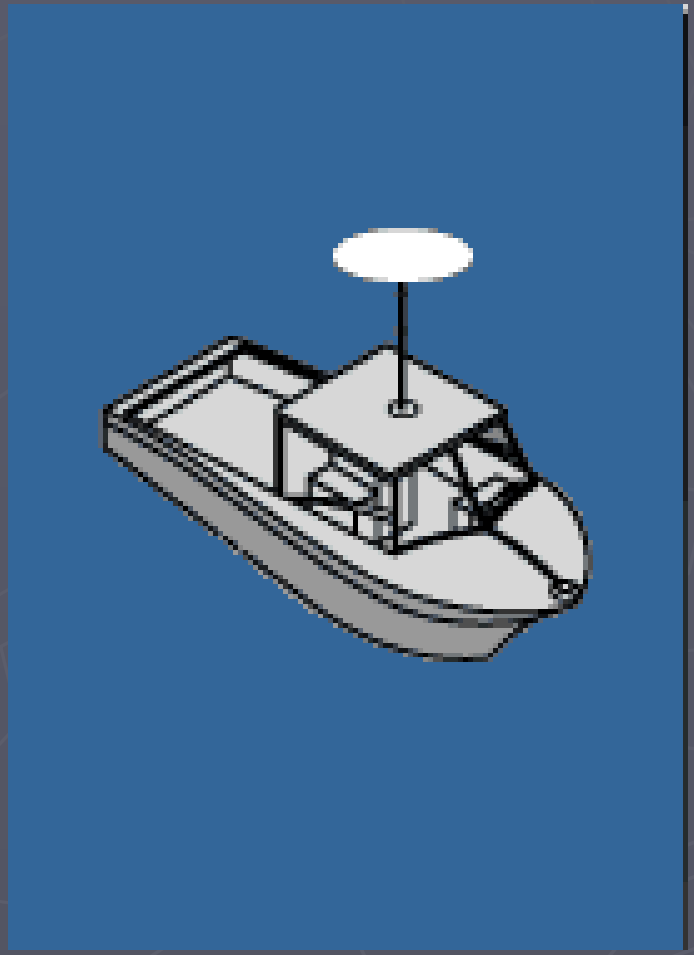
Vessel Under Oars

- Should display lights for a sailboat, if practicable.
- As an option, your vessel may carry a flashlight or lighted lantern that can show a white light in sufficient time to prevent collision.



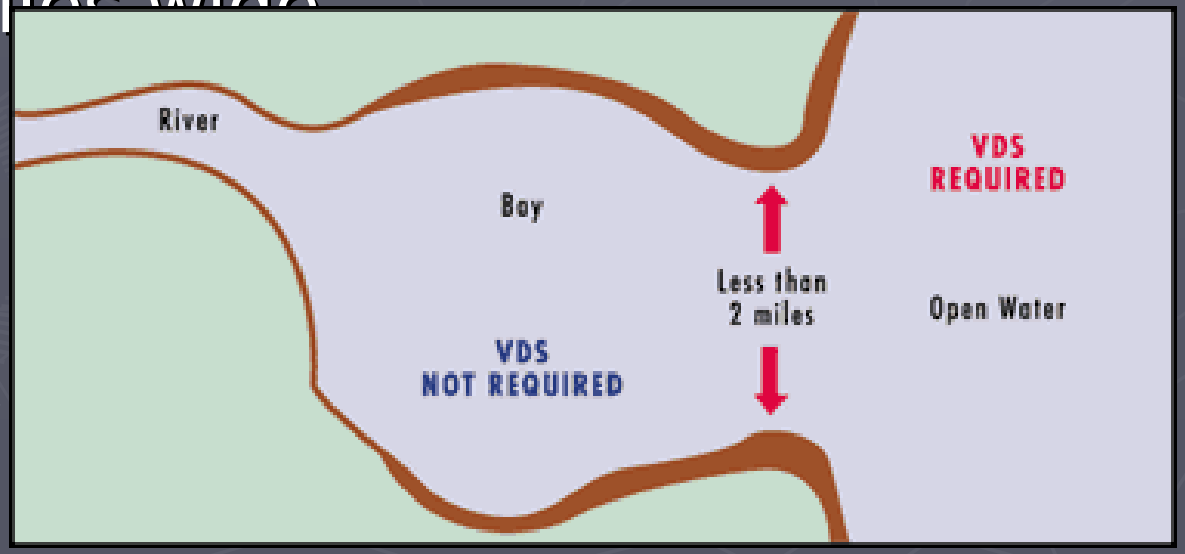
Anchored Vessels

- Night – All around white light visible for two miles
- Exception – Vessels less than 23 ft/7 m are not required to display anchor lights unless anchored in or near a narrow channel, fairway or anchorage, or where other vessels normally navigate.



Visual Distress Signals (VDS)

Required on all vessels used on coastal waters, the Great Lakes, territorial seas, and those waters connected directly to them, up to a point where a body of water is less than two miles wide.



Pyrotechnic VDS

- Must be Coast Guard approved
- In serviceable condition
- Readily accessible

Flare Pistols, Hand-held Flares and Orange Smoke Flares are pyrotec

Non-Pyrotechnic VDS

- Must be Coast Guard approved
- In serviceable condition
- Readily accessible

Orange Distress Flag and an Electric Distress Light are non-pyrotechnic VDS's.

VDS Requirements

- Pyrotechnic – 3 day and 3 night devices or 3 combination day/night
- Non-pyrotechnic – 1 day and 1 night device
- Any combination so long as the minimum number per type is carried.

Vessel Requirements

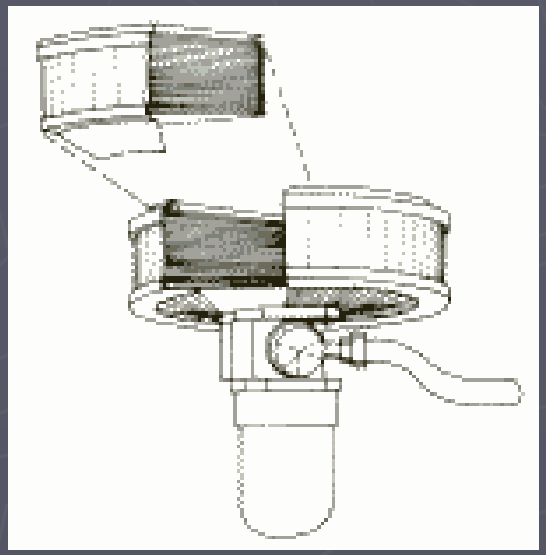
- Class A – night signals when operating between sunset and sunrise on required waters
- Class I, II, and III – day/night signals at all times on required waters
- Exceptions

Sound Producing Device

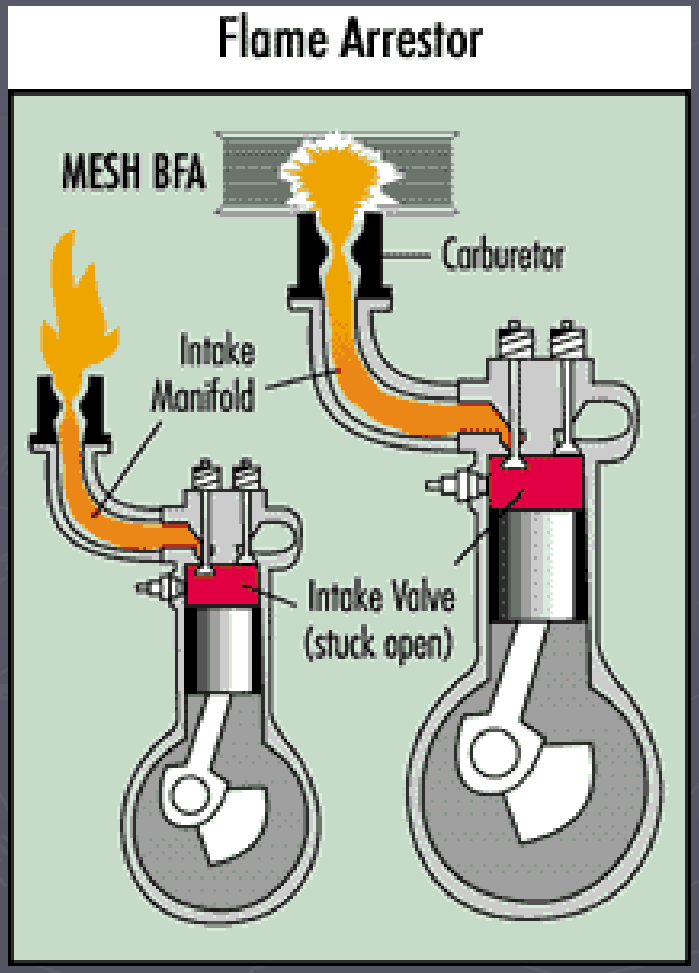
- Vessels less than 39’ 4” – some means of making an efficient sound signal (4-6 second blast)
- Vessels more than 39’ 4” – a whistle/horn audible for ½ mile and a bell.
- Vessels more than 65’ – a whistle/horn audible for 1 mile and a bell.

Backfire Flame Control

- All gasoline engines after 1940, except outboards, must have backfire flame control.
- Suppresses or “cools” flames
- Absorbs heat from flame



Backfire Flame Control



Types:

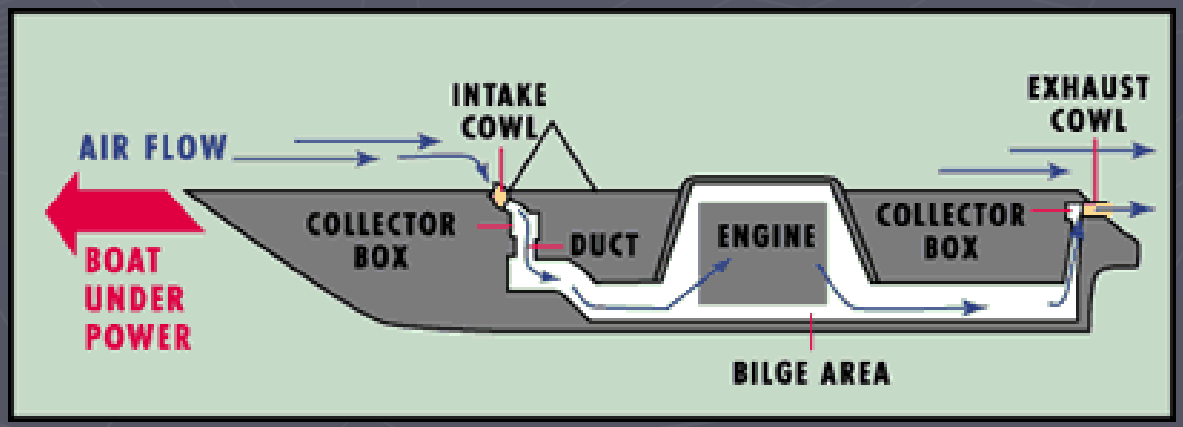
- USCG approved arrestor secured with flametight connections
- USCG approved engine air or fuel induction system
- Cowls or scoops
  - Face rear or vertical
  - No passengers behind the engine
  - All connections flametight

Ventilation

- All vessels built after April 25, 1940 and which use gasoline for electrical generation, mechanical power or propulsion are required to be equipped with a ventilation system. The ventilation system may be either natural or powered:

Natural Ventilation System

- One exhaust duct installed so as to extend from the open atmosphere to the lower portion of the bilge; and
- One intake duct installed so as to extend to a point at least midway to the bilge or at least below the level of the carburetor air intake.



Powered Ventilation Systems

- Required on vessels built after 21 July 1980 if a compartment contains a permanently installed gasoline engine.
- A powered ventilation system consists of one or more exhaust blowers. Each intake duct for an exhaust blower must be in the lower one-third of the compartment and above the normal accumulation of bilge water.
- Manufacturers of boats built after 1980 with remote starters are required to display a label which contains the following information:

Warning: Gasoline vapors can explode. Before starting engine, operate blower for 5 minutes and check engine compartment bilge for gasoline vapors.

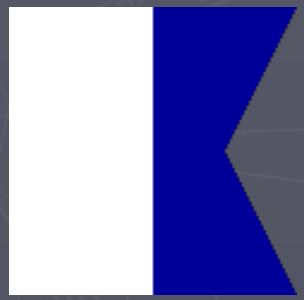
Marine Sanitation Devices

- It's illegal to discharge untreated sewage into any of California's lakes, rivers, reservoirs, or coastal waters within the three-mile U.S. territorial limit.
- All recreational boats with installed toilet facilities must have an operable marine sanitation device (MSD) on board. Vessels 65 feet and under may use a Type I, II or III MSD.
- When operating a vessel on a body of water where the discharge of treated or untreated sewage is prohibited the operator must secure the device in a manner which prevents any discharge.

Sanitation Device Types

- Type I - macerate the sewage to no visible solids, and then reduce the bacteria count to less than 1,000 per 100 milliliters.
- Type II - macerates the sewage so that the discharge contains no suspended particles and reduce the bacteria count to less than 200 per 100 milliliters.
- Type III - holding tanks (portable toilets are the simplest).

Divers-Down Flag



- Divers Down Flag
  - Red & White Protect Divers
  - Vessels 20 x 24 inches (FL)
  - Buoys 12 x 12 inches (FL)
  - Open Water - 300 Feet (FL)
  - In-Land Water – 100 Feet (FL)
- Alpha Dive Flag
  - White & Blue Protect Vessel (RAM vessel)
  - No Less Than 1 meter in height

Corps of Engineer Reqmt's:

Government operators shall be licensed and certified in accordance with ER 385-1-91

- EM 385-1-1
  - 03.B.01 b. TYPE III, 16 unit first aid kit
  - 05.J.06 d. Ring Buoys (20" diameter) shall be USCG-approved & have at least 70 ft of 3/8 in. solid braid polypropylene, or equivalent, attached. Throw bags may be used *in addition to* ring buoys. These throwable devices and lifelines shall be inspected at a minimum of every six months and stored in such a manner to allow immediate deployment and be protected from degradation from weather and sunlight
  - 19.A.05 a. Fenders shall be provided to prevent damage and sparking and to provide safe areas for workers exposed to pinching situations

- 19.A.05 c. Signal Devices (lights, sound devices, etc) shall be provided on all vessels to give signals required by the navigation rules applicable to the waters on which the vessel is operated on.

- 19.B.04 a.
  (1) At least one portable or permanent ladder of sufficient length to allow a person to self rescue by boarding the ladder from the water
  (2) Other methods or means designed to assist in the rescue of an incapacitated person overboard

- 19.D.07 Small boats with length 26 ft (7.9 m) or less shall be provided with integrated combinations of two or more of the below listed items to provide continuous perimeter protection around the vessel. The installations shall be in accordance with either ABYC Standards or ISO Standard 15085, as demonstrated by a Manufacturer’s certificate, label or other documentation.
  - Cockpits;
  - Coamings;
  - Handholds;
  - Toe Rails;
  - Life Rails;
  - Deck Rails;
  - Stern Rails
  - Bow Rails.

- 19.F.02 d. All open cabin launches or motorboats shall be equipped with “kill (dead man) switches”.

- 19.F.03 a. The minimum number and rating of fire extinguishers that shall be carried on motorboats:
  - Class A and Class I = One, 1-A:10B-C
  - Class II and III = Two, 1-A:10B-C

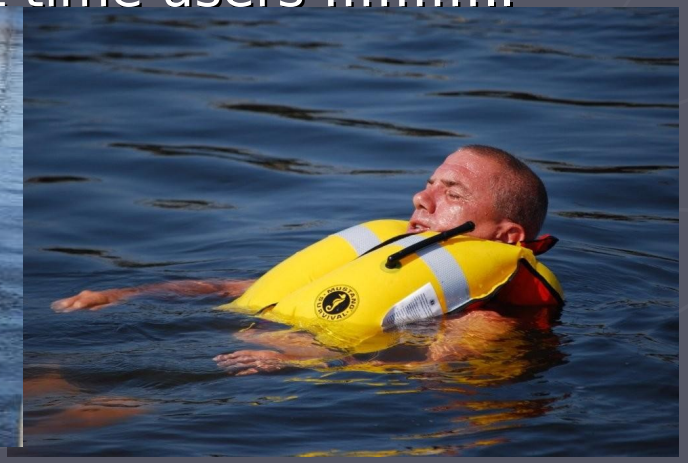
- 19.F.03 b. All motorboats having gasoline or liquid petroleum gas in cabins, compartments or confined spaces shall be equipped with an automatic CO2 fire extinguishing system

- 19.F.04 Float Plans containing the following information shall be prepared by the motorboat operator when engaged in surveying, patrolling or inspection activities that are remote and expected to take longer than four hours or when travelling alone and filed with the operators supervisor
  - Vessel information
  - Personnel on board
  - Activity to be performed
  - Expected departure and return time and route of travel
  - Means of communication

- 19.F.05 All motorboat operators shall complete and document the following training:
  - A boating safety course meeting the criteria of the USCG Auxiliary, National Association of State Boating Law Administrators (NASBLA), or equivalent; and
  - Motorboat handling training, based on the types of boats they will operate, provided by qualified instructors (in-house or other). Operators must pass a written and operational test.
  - c. Current USCG licensed personnel are exempt from the boating safety training, but they shall complete the written exam and operational test;
  - d. Government employees shall complete a USACE-approved 24-hour initial boating safety course and refresher as prescribed in ER 385-1-91.

- 05.J.01 Inherently buoyant Type III, Type V work vests, or better USCG-approved personal flotation devices (PFDs) shall be provided and properly worn (zipped, tied, latched, etc., in closed fashion) by all persons in the following circumstances:
  - a. On floating pipelines, pontoons, rafts, or stages;
  - b. On structures or equipment extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees;
  - c. Working alone at night where there are drowning hazards, regardless of other safeguards provided;
  - d. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit; or
  - e. Whenever there is a drowning hazard.

- 05.J.02 Automatic-Inflatable PFD’s Type V or better, USCG approved for commercial use, may be worn by workers in lieu of inherently buoyant PFD’s provided the following criteria are met:
  - Over 16 years old and weigh 90 lbs or more.
  - Activity Hazard Analysis (AHA) must be developed
  - PFD’s must be inspected, maintained……
  - Provide minimum 30 lbs. of buoyancy
  - Trained in the use, maintenance, restrictions ……..
  - Must be worn and not stowed
  - In-water testing required for first time users ……



- 05.J.03 All wearable PFD’s shall be of an international orange (or orange/red) or ANSI 107 yellow green color.

  - a. Each inherently buoyant PFD shall have at least 31 sq. in. (200 sq. cm.) of retroreflective material attached to its front side and at least 31 sq. in. (200 sq. cm.) on its back side per USCG requirements (46 CFR Part 25.25-15).
  - b. Each auto-inflatable PFD shall have at least 31 sq. in. (200 sq. cm.) of retroreflective material attached to its front side and at least 31 sq. in. (200 sq. cm.) on its bladder, to be visible when deployed

Additional Safety and Emergency Equipment

- Anchor and line
- Tow line and bridle
- Radios/electronics
- Mooring lines
- Boat hook
- Bilge pump(s)
- Rescue line
- Paddle
- Compass
- Tool kit
- First aid kit
- Navigation kit
  - GPS
  - Nautical Chart
- Hand-held light
- Additional PFD’s

Personnel Protective Equipment
(29 CFR 1910.132)

- EYE PROTECTION

  Clear/tinted, impact rated
- FOOTWEAR

  Non-skid/scuffing, cushioning, insulation
- HEARING PROTECTION

  Ear muffs/plugs
- U.V. RAY PROTECTION

  Sun block, clothing

TYPE I’S ARE FOR OPEN WATER

TYPE II’s ARE CALLED “NEARSHORE”

TYPE III’s ARE A COMFORTABLE FAVORITE WHEN WORKING OR PLAYING OUTDOORS

TYPE V’s ARE SOME SPECIAL FELLOWS….. SO YOU KNOW THAT THEY MUST BE WORN

AND THE THROWABLE IV CAN BE TOSSED REALLY QUICK…..TO SAVE THAT MAN OVERBOARD

AND THAT IS MY PFD DITTY, I HOPE YOU ENJOYED THE SCORE

BUT IF YOU DID’NT, THAT’S OK JUST REMEMBER THEY WORK BEST WHEN THEY’RE WORN

HUMOR?

Two ropes walk into a bar, one rope calls the bartender and says “Barkeep, let me get a couple of beers.” The bartender says “I’m sorry, we don’t serve ropes in here.”

Frustrated, the ropes walk out and since this was the only bar in town they thought about it until one rope says “I’ve got an idea!” So he gets himself into a bind and frizzles his ends and walks back into the bar and says “Barkeep, let me get a couple of beers.”

The barkeep says “Aren’t you those same two ropes that came in earlier?”

The rope answers “No sir, I’m a frayed knot.”